SECTION 7A

FLUID APPLIED WATERPROOFING

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

Military Specification (Mil. Spec.):

DOD-P-15328C	Primer (Wash), Pretreatment (Formula No. 117 for Metals) (Metric)

American Society for Testing and Materials (ASTM) Standards:

C 208-72 (R 1982)	Insulating Board (Cellulosic Fiber, Structural and Decorative
C 726-81	Mineral Fiber and Mineral Fiber, Rigid Cellular, Polyurethane Composite Roof Insulation
D 412-80	Rubber Properties in Tension
D 471-79	Rubber Property-Effect of Liquids
D 740-79	Methyl Ethyl Ketone
D 2240-81	Rubber Property-Durometer Hardness

2. GENERAL: A modified elastomer or a bitumen modified elastomer shall be used to waterproof joints, fasteners, penetrations, and concrete and steel surfaces for corrugated steel arch magazine structures. Waterproofing work shall proceed only when weather conditions comply with the manufacturer's recommendations. The material shall be fluid at 40 degrees Fahrenheit, suitable for application with equipment no more complex than airless spray guns when provided with suitable tips and powered by a conventional 150 cubic feet per minute air compressor. Required surface preparation solvents and tools, flashings, and protection course shall be included. The waterproofing materials manufacturer shall have not less than 5 years of successful experience in supplying the principal materials required. The waterproofing work, including all flashing, sealants, and protection course, shall be installed by a single firm and approved by the materials manufacturer, and specializing in this type of work.

3. SUBMITTALS: Installation instructions, manufacturer's certified test data and general recommendations shall be submitted by the manufacturer of the waterproofing materials in accordance with the SPECIAL CLAUSES.

4. MATERIALS:

4.1 Waterproofing shall be modified elastomer or a bitumen modified moisture curing urethane or other suitable manufactured elastomeric material

compounded specifically for use as a waterproof membrane. The solids content shall be not less than 85 percent by weight and the product shall have 6 months shelf life in the uncured state. The cured membrane shall comply with the following requirements:

a. Tensile Strength (Minimum): 60 p.s.i.; ASTM D 412.

b. Elongation (Minimum Ultimate): 400 percent; ASTM D 412.

c. Hardness (Shore A): 5 to 30; ASTM D 2240.

d. Water Absorption (Maximum): 1.0 percent for 21 days at 75 degrees Fahrenheit; ASTM D 471.

e. Manufacturers offering products that comply with the requirements include the following:

Manufacturer	Project
Karnak Chemical Corporation	One-Kote W-1
3M Company	Scotch System "M"
The Neogard Corporation	Perma-Gard I
Tremco Manufacturing Company	Tremproof 50

4.2 Primer shall conform to Mil. Spec. DOD-P-15328.

4.3 Joint sealant and elastic sheet flashings shall be as recommended by the manufacturer of the fluid applied waterproofing liquid compound. In addition, the elastic sheeting shall be a black polyvinyl chloride resin alloyed with plasticizers and other modifiers, formed into flexible sheets having 60 to 80 Shore A hardness, 2000 p.s.i. strength, 250 percent elongation, minus 20 degrees Fahrenheit brittleness temperature, and shall be 50 mil minimum thickness. Elastic sheet flashings may be omitted where the manufacturer of the waterproofing compound recommends application directly to the surfaces to be treated provided the waterproofing compound is applied a minimum of 60 mils thick.

4.4 Protection Course: Insulation board, ASTM C 208, construction grade, 1/2 inch thick, asphalt saturated or coated; ASTM C 726, 7/16 inch thick; or prefabricated membrane board 1/8 or 1/4 inch thick, consisting of asphalt-saturated felt laminated under pressure to both sides or with felt laminated on the bottom and a fiberglass mat laminated on top with a mineral-filled asphalt core.

4.5 Solvent for Cleaning Galvanized Surfaces: Methyl ethyl ketone, ASTM D 740.

5. SURFACE PREPARATION: Work shall not proceed until the bolts have been tightened and the surface has been cleaned of any materials detrimental to adhesion. The final cleaning shall be by spraying or wiping with methyl ethyl ketone to remove residual oil or grease. The surface shall be coated with vinyl-type wash coat applied by brush or spray at 250 to 300 square feet per gallon. A wet spray shall be maintained. The finish coat material

shall be applied as soon as practicable after a minimum of 1 hour for drying but within 24 hours maximum. Sheet type flashings shall be installed where shown with a rubber base adhesive as recommended by the waterproofing compound manufacturer.

6. APPLICATION: Prior to setting the first course of steel plates into the channel, on the topside of the curb, channel shall be filled with coal tar pitch to a minimum depth of 3/4 inch. When installing the plates, the pitch shall cover the edge of the plates. The remaining void on both sides of plate shall be filled after plates are engaged with portland cement mortar. The exterior side shall be formed to a cove as shown. A 120.0 mil application of fluid waterproofing shall be made to the cove area. This shall be followed by covering both the curb and the steel area at least 10 inches above the cove with the fluid waterproofing in two passes, each pass 60 mils, for a total thickness of 120 mils. Bolt heads and joint laps shall be covered with fluid applied waterproofing membrane uniformly applied by methods and equipment recommended by the manufacturer to a minimum thickness of 60 mils over and around the bolt heads. After this application has cured, a second application shall be made to cover the joint laps and the bolt heads to an additional 60 mil thickness. Protection course shall be installed with 8 inch wide boards over all cured membrane surfaces after testing, without delay, so that period of exposure will be minimized. The adhesive and method of application shall be as required by the fluid waterproofing manufacturer.

7. TESTS: Variations in thickness will be determined by the Contracting Officer, by gouging the membrane in place, or by a sampling and testing procedure recommended by the manufacturer. Contractor shall correct all defects and areas disturbed for testing. The product containers shall be retained for the purpose of determining, by area measure in relation to quantity of product used, that the actual average thickness of membrane complies with the requirements specified.